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DECEMBER 1965
VOL. 31 NO. 5

Soil Conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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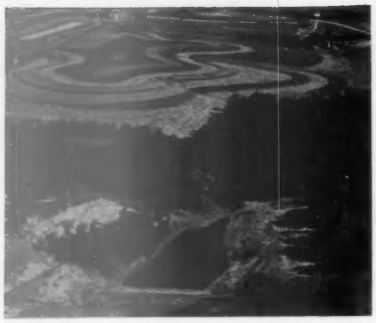
MODERN TERRACES *Page 99*

Pedernales Country *Page 107*

Roadside Seeding *Page 101*

SOIL CONSERVATION SERVICE U. S. DEPARTMENT OF AGRICULTURE



Terraces . . .

Modern farming, while shifting much land to noncrop uses, tends to intensify the cropping of that kept in cultivation. Erosion-control must be intensified accordingly.

Agricultural Engineer J. J. Coyle's lead article (p. 99) tells how SCS has kept conservation practice in step with production technology by modernizing terrace design and layout to fit today's larger machines.

Pedernales: It means "flint-rock"—the name of the river that has captured the Nation's fancy since the President epitomized his home country's history in his State of the Union message.

And it suggests the difficulties overcome in finding a harmonious way of using the land and making it bountiful and beautiful.

Our veteran Area Conservationist of the Pedernales Country, Dudley T. Mann, provided first-hand information about the land, people, and conservation efforts for our center-spread article (p. 107).

It is the story of all America's land, with the unique flavor of Texas' flint-rock country.

Roadside: Even ahead of the Highway Beautification Act, New Mexico moved, with SCS cooperation, to apply the new look to a section of interstate highway under construction (p. 101). Besides helping with the basic job of covering bare earth with grass, SCS plant materials men are starting tests of decorative plants to be included in the landscaping.

COVER: A water-control structure in the Coon Creek watershed, Wis., surrounded by woodland and terraced and stripcropped fields illustrates the combination of practices necessary for successful conservation.

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DECEMBER 1965 **VOL. 31, NO. 5**

99 Modern Terrace Design
New systems make way for large machines
By J. J. Coyle

101 Roadside Seeding Project
New Mexico uses SCS plant materials in beautification

103 More Equipment Speeds Terracing in Washington
By Lucius W. Tilden

104 Students Take Interest in Pond They Had Hand in Building

105 Tulips Add Novel Splash of Beauty to Watershed Project
By John M. Cross

107 In the Pedernales Watershed
"But men came and worked and endured and built"

112 Beauty and Recreation Are Bonus in Watershed Project
By C. Warren Curtis

113 A Soil Survey in Hawaii
By Carl W. Guernsey

115 Outdoor Teaching in High Schools

116 Community Builds a New Irrigation Pipeline

117 Reviews

119 From the Administrator
Musts for the year ahead

120 Cattle Association Builds a Novel Pond

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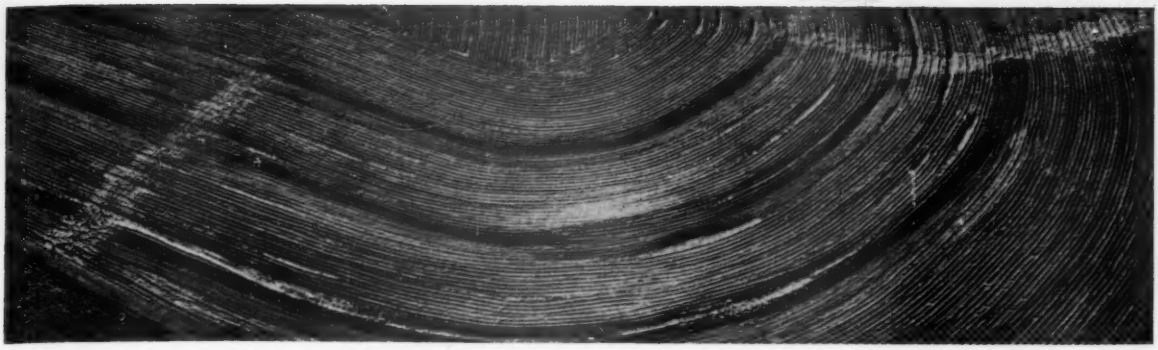


Modern Terrace Design

New systems for water erosion control make way for large machines on cropland fields

By J. J. Coyle
Agricultural Engineer, SCS, Washington, D.C.

DESIGN in farmland terraces has evolved to provide modern farmers a basic framework around which effective soil and water conservation programs can be built.

In earlier days of the crooked old-style terrace and the short point row, farmers wished for the benefits minus the bother of terraces.

Today, parallel terraces as designed by the Soil Conservation Service and constructed and used by conservation farmers offer just that, along with a solution to the new problem of matching high-speed multirow equipment with terraces, diversions, contour rows, and other cropland conservation practices.

Combination needed

Satisfactory treatment of cropland subject to water erosion usually requires a combination of mechanical measures with the use of vegetation in conservation cropping systems, stripcropping, and crop residue management.

Reduction of runoff and control of water erosion are major problems for which these practices are developed.

The Conservation Needs Inventory shows approximately 179 million acres of cropland with water erosion problems, 70 percent of them in need of erosion control measures.

The severity of the problem is underscored by the fact that on many commercial farms row cropping is on the increase.

Experimental results in the Southeastern United States show that without preventive measures continous row crops on a field with a slope of 5 feet in 100 can result in an average annual soil loss of more than 40 tons per acre. This loss is equal to 1 inch of soil in approximately 4 years. Under similar conditions but with a rotation of 1 year of small grain, 2 years of meadow, and 1 year of corn the average soil loss is reduced to about 4 tons annually.

Contour rows a must

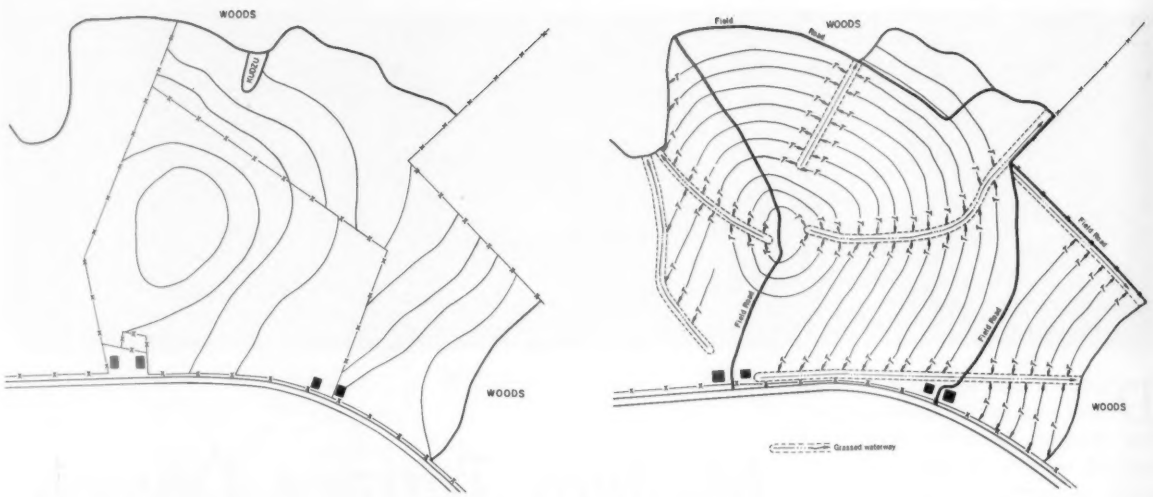
Terraces and contoured rows are practically a must where row crops occupy the land a large part of the time. In all but the very low rainfall areas, waterways, or some form of handling water from graded terraces, are imperative.

The volume of work required on this acreage is complicated further because water erosion control measures must be such that they cause only minimum interference with large, fast-moving farm equipment.

The precision-built terraces of today are designed to accommodate farming equipment as well as to hold rainfall and let it soak into the soil. On some soils, it is possible to use terraces to impound all the runoff from each intervening drainage area.

Modern equipment requires terraces and diversions of such size that four to eight rows can be planted on each face of the terrace ridge. Where grassed waterways are needed, their side slopes must be flattened so that large equipment —mechnical cotton pickers, corn pickers, combines—can cross them without damage to waterway or equipment.

Another necessity, the farm road system, usually can be installed through careful planning with little loss of farmable area. Roads for movement of equipment were not so important in the days



Old (l.) and new (r.) plans on the same central Georgia farm illustrate the revolution in conservation planning to meet the requirements of today's farming. The new plan with parallel terraces provides a complete water-disposal system and makes every part of the field accessible by farm roads.

of horse and mule farming. Neither were they essential in earlier days of mechanized farming. But with modern large equipment, much time can be lost and much equipment damage incurred in moving it over the farm without a good farm road system.

The ridges and "hogbacks" in most fields are good road locations. Another location is along the back side of the terrace ridge where good drainage makes it very satisfactory for this purpose.

Grassed waterways should not be used as roadways unless they are made extra wide to provide room for travel outside the area that will be subject to waterflow.

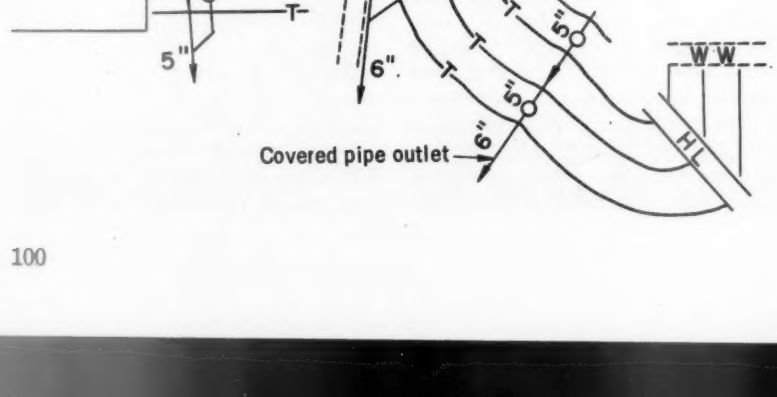
Land use changes

Soil conservation engineers are finding they can work out satisfactory terrace systems except for cropland having irregularly undulating slopes. Success of their efforts is dependent on the farmer's willingness to adjust his land use to modern equipment.

For the best terrace system, it is frequently necessary to remove from cropland use the rougher parts of otherwise good fields. Generally, the net results of such land use changes to the farmer is an increase in profits. The saving in time alone frequently more than makes up for the returns that would have been possible from the retired area.

Nearly 5,000 miles of parallel terraces were installed by soil and water conservation district cooperators in fiscal year 1965. This represents a substantial increase over the previous year and continues an annual acceleration that has been going on for the past few years. ♦

A modern parallel terrace system on an Iowa farm uses pipe outlets instead of grassed waterways.



Scout Camp Gets Conservation Look

CAMP BOXWELL, the scenic Boy Scout facility on Old Hickory Lake in Wilson County, Tenn., is taking on a conservation look. Progress to date has brought the camp the USDA's Conservation Award for the Southeast for 1964.

"We are mighty proud of the conservation work that has been carried out so far, but this is just a beginning," Coleman Wright,

camp ranger says. The plan for the 950-acre area was worked out with the Wilson County Soil Conservation District. Wright gives credit for technical assistance to the Soil Conservation Service and the Andrew Jackson Chapter of the Soil Conservation Society of America.

Among the improvements is an Arboretum of pine containing 8 species, 200 trees each: slash, loblolly, shortleaf, longleaf, Virginia, sand, white, and Japanese black pine.

Across a grass waterway on a sloping field the Hardwood Arboretum has been started. Dogwood, sourwood, maple, oaks, and other hardwood species are growing.

One small field has been established to 10 different plots of perennial grasses and legumes. These plots along with the arboretums provide opportunities for the Scouts to learn plant identification. Many native plants and trees are also readily available for study.

Thirty-five acres of idle, eroded land has also been reforested with pine. Black walnuts have been planted along roadways and openings in existing woodlands.

Waterfowl areas have been developed on 40 acres of wetland and are already attracting "quackers and honkers." The improvements made on the wetland consist of a number of dams with the reservoirs planted to buckwheat, millet, and other foods for ducks and geese. These areas are flooded during fall and winter months.

Beef cattle graze quietly on the 100 or more acres of permanent pasture that has been established. Terraces and other water-control measures may be seen.

Camp Boxwell officials are pleased with the conservation progress. Roadside beautification and stabilization, woodland improvement, and landscaping are the next scheduled improvements.—A. K. Booher, *Work Unit Conservationist, SCS, Lebanon, Tenn.* ♦

Roadside Seeding Project

New Mexico uses SCS plant materials and methods in first beautification effort

ROADSIDE BEAUTIFICATION is no easy task in New Mexico's foothill country where rainfall averages 16 inches a year, sometimes coming in torrents, and where the soils are highly erodible.

Soil Conservation Service and New Mexico Highway Department technicians will attest to that. They recently cooperated in the State's first project under the national highway beautification program along 3.3 miles of Interstate 25 between Glorieta and Rowe, in San Miguel County. A good stand of grass already covers the roadside embankments.

The project, which also will stabilize and conserve the roadsides and substantially reduce maintenance costs, involved grading, seeding with grass, and mulching 89 acres of highway rights-of-way.

Approximately 92 percent of the costs under the contract were paid out of Federal highway trust funds and the remainder from State highway funds.

SCS provided technical assistance in developing plans and specifications for the $26,000 project. An SCS soil scientist made a detailed soil survey on the project area which served as the basis for selecting grasses to be planted. SCS assigned an experienced plant materials specialist as adviser during the construction period.

Soil surveys showed that blue grama, western wheatgrass, and sideoats grama were the best species for seeding on the west portion of the project. On the sandier sites in the eastern portion, seeding was done with blue grama, sideoats grama, little bluestem, and western wheatgrass.

A few pounds of seed of native grasses from the Los Lunas Plant Materials Center, operated for

Interstate Highway 25 runs through arid country where seeding road cuts and shoulders is difficult. Native grasses were used on 89 acres along a 3.3-mile section of the divided highway.

SCS, was planted in addition to the contractor's seed at several locations by the New Mexico Agricultural Experiment Station to evaluate its potential in highway beautification and stabilization. Seed of 11 native and exotic plants also is being tested in the Interstate 25 project for possible use in future planting.

A standard grass drill, equipped with double disk furrow openers with depth control bands, was used in seeding most of the area.

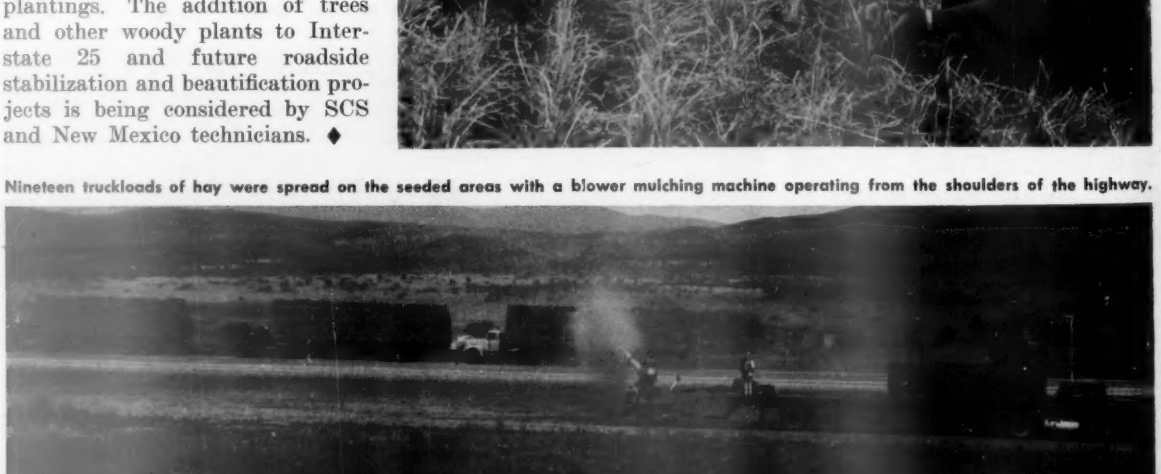
Hay mulch was used to help conserve moisture and protect the soil from erosion. Nineteen truckloads of hay amounting to 223 tons were used. Most of the mulch was applied with a high-powered blower operating from the highway shoulders.

The hay mulch was punched into the surface of the soil to a depth of 2 to 3 inches to create an artificial stubble to protect the planted species during the critical time of grass establishment. It was necessary to anchor the hay mulch as soon as possible after drilling and applying the mulch to keep the soil loose.

Tests are being made at the Los Lunas Plant Materials Center to determine how native wildflowers may be added to the roadside plantings. The addition of trees and other woody plants to Interstate 25 and future roadside stabilization and beautification projects is being considered by SCS and New Mexico technicians. ♦

A standard grass drill (above) was used for seeding the slopes after grading and preparing a seedbed. Hay mulch was pressed into the soil to create an "artificial stubble" (below) to protect the new seedings. SCS technicians Glenn Niner (l.) and Archie Fuchs are pleased with the results.

Nineteen truckloads of hay were spread on the seeded areas with a blower mulching machine operating from the shoulders of the highway.



More Equipment Speeds Terracing In Southern Washington District

By Lucius W. Tilden
Soil Conservationist, SCS, Goldendale, Wash.

SUPERVISORS of the Central Klickitat Soil and Water Conservation District in southern Washington think they are on the move to meeting the needs of sloping croplands of their district for terraces, diversions, and waterways.

District records show that some 195 miles of gradient terraces were established in the district up to July 1965, and 3 to 5 miles are being applied each year.

Fairly widespread use has been made of stubble mulching, contour seeding, minimum tillage, and rotations including grass and legumes to retard erosion. But, as one district supervisor says, "These practices have helped, but we need more terraces, diversions, and waterways. We're still losing too much soil and water."

Floods show need

Heavy runoff during December 1964 and January 1965 caused serious erosion, sedimentation, and road damage and left the area without railroad service from late December until May 15. Even city dwellers saw the need for better controlling runoff. To farmers, the floods pointed up their need to install terraces and waterways.

One factor affecting the amount and quality of terraces built has been lack of adequate equipment. Another factor is the short season during which soil moisture and weather conditions are right for terrace construction or where farmers have settled for lesser amounts or for terraces of lower capacity.

Supervisors of the Central Klickitat District decided to do something about the equipment problem. A large versatile power grader run by a skilled operator appeared suitable for the job.

In this northwestern area, terraces often drift full of snow or clog with ice during the winter. A wide channel and good berm height are necessary to prevent overtopping when spring thaws occur. The supervisors, therefore, believed they needed equipment capable of building large terraces.

They also thought that more terraces would be built if a contractor were available to do the work when conditions were right and without interrupting the farmers' own seasonal operations.

The district supervisors and SCS Technician Duane Lewis urged local contractor Ed Doubravsky and others to buy a suitable grader and make it available for conservation work. The super-

This large motor grader, building a terrace on the Cora Richardson farm near Goldendale, Wash., does the job faster with fewer trips.

visors and those of the Eastern Klickitat District also met with the Klickitat County commissioners and worked out an agreement whereby county equipment could be obtained for conservation work when private equipment was not available.

Grader does the job

Doubravsky acquired a motor grader in April. His first job with it was on the Cora Richardson farm, operated by Claude Knight. Here Doubravsky finished some terraces that had been staked and plowed out in October 1964. The resulting terraces were large, well shaped, and packed.

Another job was for Anthony "Tony" Sarsfield on his farm near Warwick. About 3,440 feet of terraces were constructed in 27 hours and approximately 2,600 feet of waterway shaped in another 5 hours at a cost of $12.50 an hour. Tony was pleased with the results as well as the cost and said, "I didn't have either the time or the equipment to do the job myself."

In this district, use of a moldboard plow and dozer or a small pull-type grader for terrace construction has cost farmers $100 to $150 per 1,000 feet of terrace. In addition, two men were often required to do the job. Often the farmer was "tied up" at a normally busy season.

Using the motor grader and a skilled operator frees the farmer for other jobs and appears to produce a better terrace at no greater cost. In another district where many terraces have been built using motor graders, an average cost of $90 per 1,000 feet has been established. Tony Sarsfield's costs compare well with this figure.

Supervisors of the Central Klickitat District see there is still a conservation job to be done, and their efforts and encouragement are speeding its progress. ♦

Students Take an Interest in Pond They Had a Hand in Building

WORK Unit Conservationist Charles E. Davies is sure the fifth graders of North Elementary School in Brighton, Colo., have a special interest in Mike Tashiro's big pond. They helped with the building of it.

Tashiro, a conservation farmer in the West Adams Soil Conservation District where Davies works, recognizes their contribution. In appreciation, he plans to let the youngsters enjoy fishing there.

According to Davies, this is how it was—

Mike Tashiro raises vegetables—peppers, onions, sweet corn, and cabbages—for the Denver market. He needed the pond as a cushion against emergency need. It holds water for times when the regular supply, from ditch or the wells, may fail. The ditch supply has been known to fail in dry years, the pumps on the wells can break down or the power fail. Tashiro can fill the pond at night and during rainy spells and use the water when he needs it.

The Tashiro farm is one of the places where teachers regularly bring groups of pupils to see soil and water conservation being done. Principal Richard Clark of North Elementary, for example, is a firm believer in out-of-doors learning. The school superintendent, Mrs. Bertha Hyde, and the other principals in that area agree. Mike Tashiro likes to have them come to see conservation in action.

There was action that day during the building of the pond. The excavation and shaping were finished. Everything was ready for the placing of sheets of plastic to keep the water from seeping out. Using the plastic for such a purpose was new in the area. But Soil Conservation Service engineers were sure it would work. Just then Mrs. Margo Sack and her fifth grade class arrived on one of their scheduled outdoor study sessions. When the first sheet of vinyl was unloaded the pupils helped to tuck the edge into the anchor trench. Mrs. Sack then placed the first shovelful of backfill earth. Then the pupils took places along the

A small grader is used to roll earth onto the plastic liner to seal the pond bottom.

Mrs. Margo Sack, fifth grade teacher, does the honors (l.) with the first spadeful of dirt as her class volunteers to help place the plastic liner in the Tashiro pond. Members of the class help (r.) secure the first sheet of plastic in trench above waterline of pond.

roll of plastic and gently unrolled it as workmen tossed enough earth onto its surface to anchor it until the earth blanket could be pushed onto it by machinery.

When the first 60-foot sheet of plastic was in place, the pupils saw how the edge of the second sheet was overlapped on the first about 6 inches and fastened with cement.

Tashiro stocked the pond with fingerling trout last year. The fish are a good size for catching now. But one thing is certain: Tashiro says only children of grade school age will fish for them. Dads may come along to help the extremely young visitors bait hooks, but that's as far as grownups can go. This pond, which the youngsters helped to build, will be a fisherman's dream of course.

It is safe to assume that the new generation in the West Adams District, enjoying the body-sustaining foods that make vigorous, alert, grownups, will have a lifelong awareness of the role of soil and water—and their conservation use—in the building of a strong and beautiful America. ♦

Tulips Add Novel Splash of Beauty To Louisiana Watershed Project

By John M. Cross
Assistant to the State Conservationist, SCS, Alexandria, La.,

WHEN the Tensas-Concordia Soil and Water Conservation District in Louisiana's Mississippi River Delta set out to get approval for the North Tensas watershed, they put Ed McDonald, Sr., on their team. It was thought his experience as a landowner, businessman, conservationist, and prime mover would make success a certainty. It did.

An unexpected bonus was a dash of beauty not often found in a watershed project. When the contractor moved away from the fourth and final job on more than a hundred miles of new channels, beds of tulips were sprinkled far and wide across the landscape—thanks to Ed McDonald, "The Tensas Tulip Man."

Not satisfied with the grass, the tall timber and the fields of waving grain, McDonald headed a tulip-planting campaign.

Where small landowners of moderate means were reluctant to invest in the bulbs, Mr. Ed donated them. Small islands of tulips and other flowers dot the long stretches of cultivated fields. Mailboxes seem proud to stand tall in the splashes of color. More than a million tulip bulbs have been set, most of them in the North Tensas watershed.

On his Durosset Plantation, just off the Great River Road, McDonald has converted an old dairy barn into a "bit of old Holland." Around it are 12 acres of gardens, splashing color almost beyond description.

"Louisiana Dutch" maidens serve as hostesses in native costume. Tulips, anemones, ranunculus, and jonquils start the blooming season, and it is kept alive with a chain of flowers on into summer and fall. More than 250

flowering shrubs form the backdrop.

McDonald will be the first to say he did not do this job alone. There was George Bagley, a supervisor of the district, and his live-wire wife, Barbara, and District Attorney Tom Clark, County Agent Charles James, Soil Conservation Service Work Unit Conservationist James Barbre, and a host of others.

Before a shovelful of earth ever was moved in the watershed McDonald could see the end of floods that had been sweeping away the beauty and the bounty of Tensas Parish. He saw miles and miles of fresh water fishing. He saw vast expanses of green grass on land that had not been paying the taxes because it was subject to flooding and not used. He saw herds of deer grazing on food plots planted just for them.

When McDonald wandered into Tensas Parish from Florida back in 1920, great potential was evident to him in the rich, Mississippi alluvium soil. From his first job with an elevator he has built a prize herd of cattle, and a gin and elevator of his own—or in partnership with his sons.

The flood of 1927 just a few short years after his arrival failed to dampen his spirits. Regular inundations since then have only made him more determined to lift his parish out of the mud.

With help from the Soil Conservation Service, teamwork with soil and water conservation districts and a lot of other folks, he settled the problem through Public Law 566.

An ardent conservationist, he served 7 years as chairman of Louisiana's Wild Life and Fisheries Commission. He has served many years on the Tensas Parish Police Jury (governing body), worked for a hospital building and has been a leader in other community efforts. Recently he was appointed to the State Agricultural Stabilization and Conservation Committee.

During the 1927 flood he and his neighbors took food by boat to a little herd of deer marooned on a high spot, and the parish now has deer everywhere.

Recently Ed McDonald was honored by the Dutch Government for his contribution to international understanding. Later there will be an international cultural exchange initiated by him whereby students from Holland will come here to study.

"None of this would have been possible without the North Tensas watershed," says Mr. Ed. ♦

Ed. R. McDonald, Sr. (l.), ardent conservationist, tells George R. Bagley how Dutch Gardens got started in Louisiana's North Tenas watershed. Bagley is an SCD supervisor.

Engineering, Crop, Soil Societies Meet

The American Society of Agricultural Engineers (ASAE) held technical sessions on soil erosion, irrigation, hydrology, and drainage at its winter meeting, December 8-19, in Chicago, Ill.

On December 6 and 7, the ASAE, Soil Conservation Society of America, the International Commission of Irrigation and Drainage, the Crop Science Society of America, the Soil Science Society of America, the Botanical Society of America, and the American Society of Civil Engineers sponsored a conference on "Drainage for Efficient Crop Production."

These meetings brought together many of the leading scientists in engineering, soil science, and botany, who have an interest in drainage. ♦

Conservation Research Reports

A new series of the Department of Agriculture publications makes available semitechnical or technical information resulting from research directed toward the conservation of renewable natural resources. Included in this category are reports of conservation research and reports on less complete research projects than are reported in the technical bulletin series. This new series is now in effect and is available for use by any agency for manuscripts meeting the series criteria. ♦

"But men came and worked and endured and built . . ."

In the Pedernales Watershed

Sturdy pioneers colonized a harsh country; today their sons improve the land's resources

It was once barren land. The angular hills were covered with scrub cedar and a few live oaks. Little would grow in the harsh caliche soil. And each spring the Pedernales River would flood the valley.

But men came and worked and endured and built.

Today that country is abundant with fruit, cattle, goats, and sheep. There are pleasant homes, and lakes, and the floods are gone.—President Lyndon B. Johnson's State of the Union Message, 1965.

LESS than a century and a quarter ago, the land along the Pedernales River was rugged, rocky, raw country, ruled by warring Comanche Indians.

It was the land of the mountain lion, black bear, coyote, rattlesnake, and earlier the buffalo. It was also a land covered with tall grasses and scattered small trees and native shrubs that supported the wild game and absorbed the erratic and sometimes violent rainfall.

The Pedernales watershed of approximately ¾ million acres lies across two counties, Gillespie and Blanco, in the Texas "Hill Country" west of Austin. The river joins the Colorado near the Balcones Escarpment about 25 miles upstream from Austin, a rugged ledge of limestone marking for 200 miles the eastern edge of the Edwards Plateau and visibly separating the ranching West from the farming East.

Indian domain

The game-rich hills and spring-fed canyons of the Hill Country remained the domain of the Indians while Anglo settlers tamed the woodlands and prairies east of the escarpment and the young Republic of Texas established its thriving urban capital at Austin.

The early Spanish explorers and the Mexican missionaries of the Eighteenth Century left little trace on the land, save for a few place names, like "Pedernales." The name seems to have evolved from the word "pedinal," which means "flint rock." It was an apt choice for a stream that flowed over cherty limestone beds through a country where Indians left many mounds of flint rock fragments from making arrowheads. The word gradually changed to "Pedinales," and now the accepted spelling is "Pedernales," although natives of the area more often pronounce it "*Per*denales."

This was the country as seen by the first permanent white settlers in the years just before the Civil War. The story of its settlement and conquest, its reaction to too intensive uses, and the constructive efforts of today's citizens to preserve and improve its resources is the common story of the American land—but with details peculiar to the character of the area and its people.

Two conservation districts

Two soil conservation districts now include the Pedernales River watershed, with boundaries that coincide with the two counties previously mentioned. More than 75 percent of the land owners and operators are cooperating in planned conservation programs, in-

The Pedernales River winds its way through the picturesque Texas Hill country. Dam in foreground serves as a roadway.

Under good management, tall range grasses thrive on a conservation ranch, recreating a scene such as greeted the first settlers.

cluding President Johnson on his famous LBJ ranch in the Gillespie Soil Conservation District and other land in the Pedernales Soil Conservation District.

Permanent agriculture began in the Pedernales country when a colony of German immigrants under the leadership of Baron John O. Meuseback founded the town of Fredericksburg between two tributary creeks in 1846. Supplies that were supposed to reach them before the first winter failed to arrive and the colonists suffered extreme hardships and many deaths.

The colony included highly skilled craftsmen in most of the trades to make it selfsupporting. Each was allotted a small tract of land in or near the town and a larger one farther out. They worked together to build their first houses of logs and planted crops on their country places.

Being traditionally inclined to build permanent structures, they soon began quarrying limestone from the surrounding hills. The work of the skilled stone masons still stands as a part of many of the buildings in modern Fredericksburg.

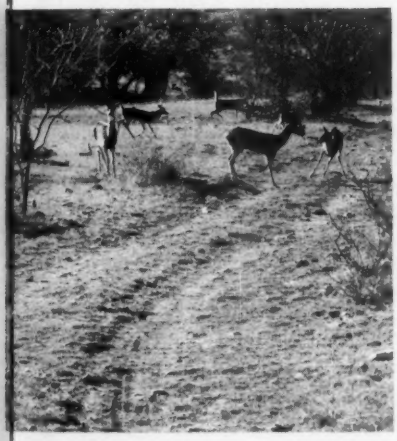
Baron Meuseback soon gained the confidence of the Indians, and in 1847 he made a treaty with the chiefs establishing the San Saba River as a boundary between Indian territory and the settlement. This made it possible for the settlers to spread out with farming and ranching interests. Gillespie County, with Fredericks-

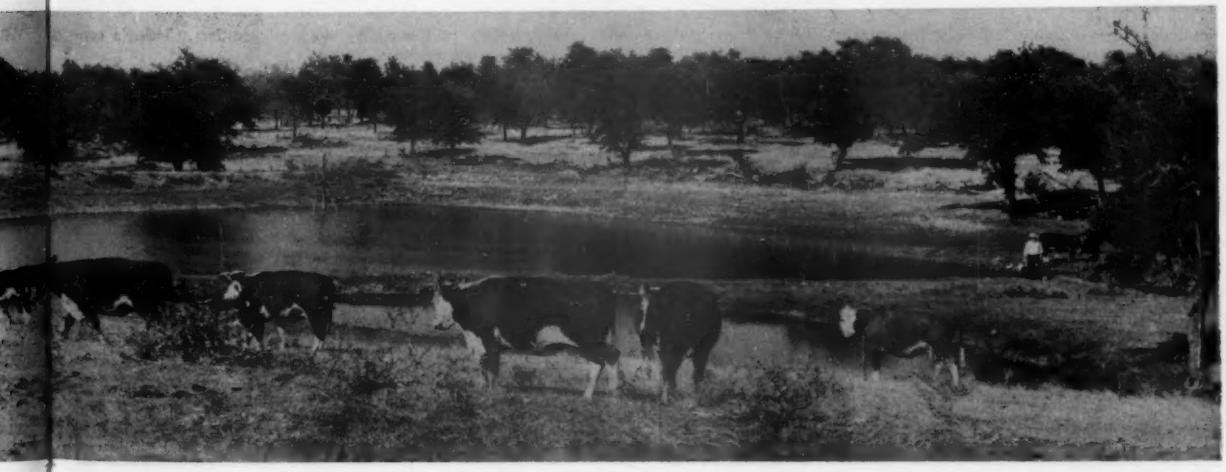
Recreation is a byproduct of this ranch pond constructed to provide water for livestock.

Numerous ponds dot the upland ranges, providing water for livestock and holding back runoff water from the valleys below.

Goats are grazed in combination with cattle, sheep, and deer on the same range.

nd on the brushy range and or source of income to many





burg as the seat, was organized in 1848.

Meantime, venturesome pioneers from the East, including the President's grandfather, Samuel Ealy Johnson, and his brother Tom, were raising cattle in the hills downstream and trailing them to Kansas markets. Settlements sprang up at scattered points along streams, and Blanco County was organized in 1858. Johnson City became its county seat.

As the settlers harnessed the land for agriculture, they concentrated their cultivated fields in the stream bottoms and on sandy soils easy to till with simple horse-drawn tools.

After a period of subsistence farming, cotton was the early cash crop of the area. At one time 20 cotton gins operated in the 2 counties. Today only a few acres of cotton are planted, and all the gins are abandoned. Farmers learned that the clean-tilled crops robbed the soil of organic matter and hastened erosion. They switched to small grains, grain sorghums, and perennial grasses that offer more protection to the soil.

The early settlers let their cattle roam the range along with deer and other wildlife. The animals thrived on the tall native grasses.

Gradually, the settlers built rock fences, increased the size of their herds, and confined them to certain areas. Later they brought in sheep and goats and put up wire fences.

Carlos Grote, supervisor of the Pedernales SCD, inspects an excellent growth of grass after removal of cedar from a brush-invaded range. Oak was left for wildlife food and cover.

Heavy grazing by the livestock and wild game thinned out the tall native grasses. Thick growths of brush, such as cedar (juniper) and oak, closed in, taking sunshine and moisture from the grasses and cutting forage growth sharply.

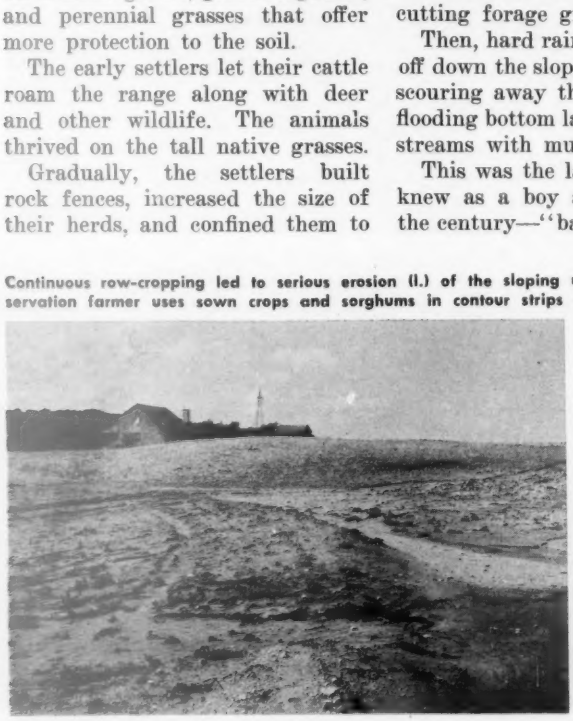
Then, hard rains sent heavy runoff down the slopes, cutting gullies, scouring away the shallow topsoil, flooding bottom lands, and clogging streams with mud.

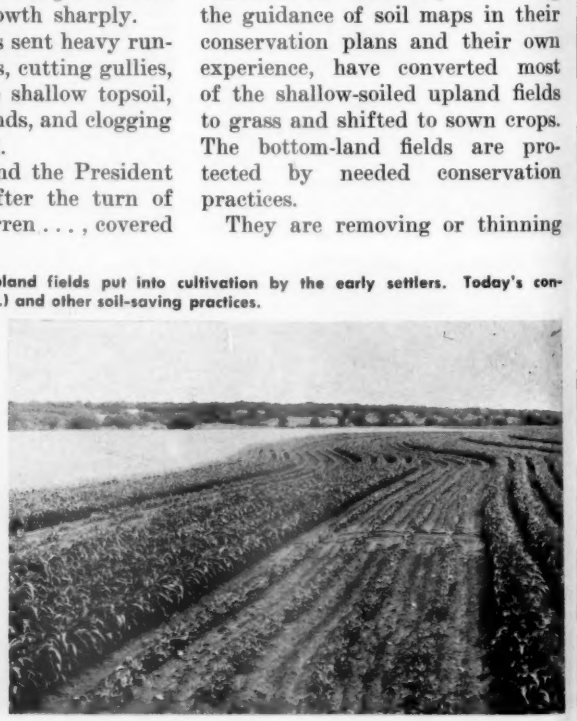
This was the land the President knew as a boy after the turn of the century—"barren . . . , covered with scrub cedar and a few live oaks . . ; little would grow in the harsh caliche soil."

Today new generations of farmers and ranchers are learning to respect the limitations and understand the potentials of this peculiar land. Cooperators with the soil conservation districts, following the guidance of soil maps in their conservation plans and their own experience, have converted most of the shallow-soiled upland fields to grass and shifted to sown crops. The bottom-land fields are protected by needed conservation practices.

They are removing or thinning

Continuous row-cropping led to serious erosion (l.) of the sloping upland fields put into cultivation by the early settlers. Today's conservation farmer uses sown crops and sorghums in contour strips (r.) and other soil-saving practices.





the unnatural growths of brush on their rangeland and giving the grasses a chance to grow again. With better understanding of the requirements of the plants and the potentials of different range sites, they are managing the grazing of livestock to rebuild the water-holding blanket of grass their forefathers found on the rocky hills.

A chain of lakes

On the mainstem of the Colorado River above Austin, the Lower Colorado River Authority has built dams creating a chain of lakes—Travis, Marble Falls, Granite Shoals, etc.—where the President enjoys boating on his visits home and where thousands of local people and tourists gather for fishing and water sports.

The floods are indeed gone from the main stream, but upper tributaries still overflow when the occasional cloudburst dumps more water on the land than the shallow soils can hold.

The people along Williams Creek, a tributary of the Pedernales River below Stonewall, have applied for a small watershed project under Public Law 566. The work plan proposes flood-prevention measures to protect the bottom-land area around Albert.

Major overflows occur on the Pedernales at irregular intervals of 10 to 15 years, the most recent in June 1965. The Gillespie County Water Control and Improvement District and the Gillespie County Soil Conservation District jointly plan and encourage water-control measures.

The two conservation districts cover about 704,000 acres. Of this total, about 615,500 acres, or 87 percent, is rangeland and 77,500 or 11 percent is cropland. Miscellaneous and urban areas make up the remaining 11,000 acres.

Beef, mutton, wool, and mohair provide the principal agricultural income of the area. Wheat, oats, grain sorghums, and forage sorghums are the main agricultural crops. Peach orchards are becoming more important. Hunting leases also are an important part of many ranchers' income.

Truck crops are becoming more important in the local agriculture. Helmuth Klinksiek, a cooperator with the Gillespie County SCD, picks a crop of bell peppers.

The Texas Parks and Wildlife Department, soil conservation districts, and other groups help landowners develop and manage their wildlife resources. Plans include increasing forage production for wild game and domestic livestock, improving the habitat for wild turkey and quail, and improving deer hunting arrangements.

Among the practices applied by the cooperators of the two conservation districts are: Brush and weed control on rangeland, 125,000 acres; deferred grazing, 332,000 acres; proper range use, 388,000 acres; conservation cropping system, 59,600 acres; contour farming, 49,800 acres; crop residue use, 58,000 acres; diversion terraces, 593,000 feet; terraces, 6 million feet; and 523 farm ponds.

The entire Hill Country long has been attractive to tourists because of its mild climate, natural beauty and ruggedness, excellent deer hunting, friendly people, tasty foods, historic sites, interesting architecture, and its nearness to Austin and San Antonio.

Since Lyndon Baines Johnson became President, national attention has been focused on his "home country." Tourists constantly pour into the area to get a glimpse of his LBJ Ranch, his nearby birthplace and first school at Stonewall, and his boyhood home in Johnson City.

Jet planes and helicopters today shuffle important people in and out of the Pedernales country where once the stagecoach was the main means of transportation.

The people are putting increasing emphasis on developing the natural resources of their area. They believe that theirs is a land of great potential and promise and they are working steadily to achieve their goals. ♦

Beauty and Recreation Are Bonus Benefits in Iowa Watershed Project

By C. Warren Curtis
Work Unit Conservationist, SCS, Logan, Iowa

IF serendipity may be defined as unexpected good fortune while in pursuit of a goal, then the small watershed program is full of it. For, quite often, the side benefits from a watershed project equal or outweigh the main purpose.

Such was the case with the Dunlap subwatershed of the Mill-Picayune Creek Project at Dunlap, Iowa. The project's contribution in restoring natural beauty to the area has stimulated new community pride in the town's 1,250 residents. And the creation of a small lake has greatly enlarged local recreation opportunities.

Unexpected dividends

These were both bonus benefits that will pay dividends for years to come.

The primary goals of the project sponsors were to reduce periodic damaging floods and eliminate the town's eyesore—a deep gully that cut across the south edge of the community.

Aggravated by uncontrolled runoff over the years, the gully got bigger. It became a rat infested dump yard in dry periods and a mosquito breeding ground in wet years.

In 1959, Dunlap residents saw a solution to their problem in the Small Watershed Program (Public Law 566). Work on the plan went ahead well, and in June 1960 Congress approved the project. Plans called for conservation measures on the uplands and a watershed dam above the town to afford a high degree of flood protection.

But 3 years elapsed before the dam was built. Getting the necessary easements and rights-of-way was a bigger task than many had realized. The project sponsors—the town of Dunlap, Harrison County Soil Conservation District, Harrison County Board of Supervisors, and Iowa Highway Commission—had to obtain easements from 39 individual landowners.

It was during this time that some townspeople had misgivings about the project. These proved to be unfounded. The easements were obtained and the city purchased a 43-acre tract of land above Dunlap for location of the flood-retarding dam.

With completion of the dam, the unsightly gully was cleaned up, grubbed out, reshaped, and seeded as a waterway. Six old wooden bridges that spanned the ditch were replaced with low maintenance metal culverts.

Beautification

Dunlap Mayor Leonard Jacobsen said, "That waterway is just like a carpet of grass." He voiced the views of many Dunlap residents when he said, "We have a wonderful start here toward making Dunlap the best groomed community around."

The mayor feels the project will encourage many individual property owners to take on beautification campaigns of their own.

And recreation

With the threat of floods and the ugly ditch behind them, the townspeople have shifted their interest to the watershed dam and the 9-acre lake behind it. The dam construction took 81,153 cubic yards of earthfill. It is 45 feet

Community leaders meet by the concrete inlet of the flood-retarding structure to discuss recreation plans for the 9-acre lake. They are (l. to r.) Louis Culver, chairman of district commissioners; Leonard Jacobsen, mayor of Dunlap; LaVerne Wertz, president of the Lions Club; Warren Curtis, work unit conservationist, SCS; and Calvin Leader, president of the Booster Club.

high, 525 feet long, and has a 100-foot-wide emergency spillway.

The municipally owned lake and adjoining 34 acres of land form the foundation for a new recreation area. Access roads, picnic sites, boat dock, and rest rooms will be built. The Fish and Wildlife Service has stocked the lake with 1,000 largemouth bass.

In addition, there are plans to use the recreation areas as an outdoor classroom for teaching conservation.

Much credit for the project is attributed to Louis Culver, chairman of the Harrison County District, and owner and operator, with his son, Jerry, of a 450-acre farm east of town. Culver is a member of the Iowa Natural Resources Council, a member of the Governor's State Recreation Board, and a member of the Western Iowa Experiment Farm at Castana.

Citing benefits of the watershed project, Culver said that property values have gone up, and several new buildings have been constructed.

Wildlife habitat has also improved. Earl Weber, landowner in the subwatershed, said, "The number of pheasants on my farm has increased tremendously since the deep gully was pushed in and seeded to alfalfa and bromegrass." He also said he has sighted as many as 12 to 15 mallards on his pond at one time, where he'd never before seen a single wild duck.

Among other benefits from the project are reduced gully erosion on agricultural land, reduced erosion damage along the highway, lower highway maintenance costs. These benefits alone are estimated to be worth $4,150 a year.

What did the project cost? The Federal Government's share was $85,777 for the dam and needed work on the ditch. The local costs included the easements and rights-of-way, land for the reservoir, and the costs of the culverts and their installation. ♦

A Soil Survey in Hawaii

By Carl W. Guernsey

Assistant in Agronomy, University of Illinois, Urbana, Ill; formerly Soil Scientist, SCS

THIS HOOSIER soil scientist never fell out of a pineapple field during 14 weeks of soil survey work on the Island of Maui, Hawaii, but it would have been easy to do. It was a new experience to look out the window of a laboring jeep to see pineapple plants on one side and the edge of a 3,000-foot gulch on the other.

Pineapple industry

I was there in response to a request from the Maui Pineapple Company, through the West Maui Soil and Water Conservation District, for assistance in solving soil conservation problems on its pineapple land. This company is the only pineapple producer on West Maui. The plantation management is aware of the usefulness of a detailed soil survey not only in design and installation of conservation practices but to help solve disease, fertility, and crop adaptation problems as well.

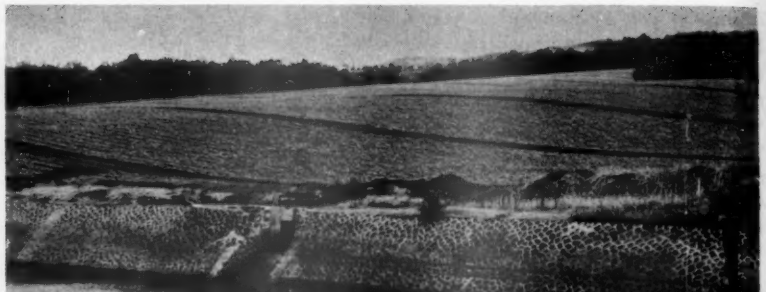
Like all islands of the Hawaiian group, Maui is of volcanic origin and is mountainous. It shares with other islands the low proportions of potentially arable land. This low proportion is all the more striking when one sees the intense efforts to use each acre profitably. For someone whose experience is primarily in Midwestern U. S. A., the concept of soil is broadened when he has an opportunity to see how the large industrial farms are using it.

Agricultural assets

The biggest agricultural assets of Maui are the year-round growing season and the availability of water. The soils themselves are not particularly fertile, although many of the red soils do have desirable qualities such as good natural drainage and a high degree of resistance to erosion. But most important are the available water, sunshine, and the temperature which seldom falls below 60 degrees in agricultural areas.

The Pineapple Research Institute (PRI) conducts research for the Maui Pineapple Company and for all pineapple producers in

Intense storm in 1961, yielding 25 inches of rainfall in 36 hours, caused severe gully erosion in pineapple field.



The plantation constantly studies new cane production methods. Push rakes (l.) remove several tons of soil an acre during each sugarcane harvest. For sugarcane irrigation at lower elevations (r.), well-designed reservoirs store water from high rainfall areas. Pineapple in background needs no irrigation because of its low water requirements.

Hawaii under a plan in which each producer contributes an annual sum of money to the PRI research fund, along with a list of research needs. Research data and interpretations from these joint projects are then made available to each producer.

The PRI conducts research and makes data available to producers on a continuing basis. It is constantly trying to tie its research to defined kinds of soil so that data and predictions from the research can be applied over the widest possible area.

Soil maps and legends prepared by the Soil Conservation Service are thus a useful tool to enable pineapple producers to make maximum use of research information furnished by the PRI.

Survey procedures

In organizing the survey the soil survey leader decided that the party needed some pits for soil classification and correlation. The pineapple company furnished plantation laborers to dig 15 pits and offered to give any additional help needed.

The survey party then met with the plantation manager and his staff to explain soil survey methods and procedures and asked them to furnish information on production problems experienced in different fields. When the survey was completed, a field tour was held to explain the soils and soil maps and to see and discuss representative soils in the field.

Plantation soils

Soils mapped on the plantation were currently classed as Low Humic Latosols, Humic Ferruginous Latosols, and Humic Latosols. A predominant reddish-brown color, high clay content, relatively high organic matter content, high infiltration and percolation rates, and strong resistance to shear are characteristics shared by soils in these three great soil groups.

Determining the actual proportions of clay in these soils is difficult (clay as used here refers to very fine mineral particles). In the laboratory it is almost impossible to get soil samples completely mixed with water and dispersed so that the clay can be accurately measured. As a result, many of the clay particles remain grouped together into small aggregates of silt size and are not measured as clay. Even so, analyses give figures of 50 to 70 percent clay for many of these soils.

This tendency of the clay particles to resist wetting and to remain grouped into silt-size particles also makes it difficult for a soil scientist to determine the soil texture in the field.

The strong resistance to shear exhibits itself in banks and road cuts which stand vertically with minor slumping, sliding, or sloughing; it has a practical importance to agriculture because it imparts stability to the soil mass and thus prevents detachment of individual soil particles in the first stage of the soil erosion process. Resistance to shear becomes apparent indeed when one attempts to use a "sharpshooter" spade to dig a pit for field study!

Organic matter is high in comparison with light colored soils of the Midwestern United States. Moreover, it is distributed rather uniformly throughout the top 3 or 4 feet of the soil rather than being concentrated in the surface layer. Few Low Humic Latosols have less than 3 percent organic matter, while the figure may rise to 8 percent for Humic Latosols.

Infiltration and water percolation rates for these soils are apparently high. While few data are

available to bear this out, the very low volume of runoff during and after a heavy rain can be qualitatively measured by onsite observations. The small amount of rainfall that does run off is often clear, or nearly so, even in freshly tilled fields. Infiltration and percolation rates, 3 to 10 times the average rates of soil in the Midwestern United States, seem probable.

Soil features

Soil features new to this Hoosier soil scientist include: (1) The concentration of manganese dioxide (MnO_2) in the Low Humic Latosols, (2) the differences in bulk density of some soil layers in Humic Ferruginous Latosols, and (3) the extent to which extremely stony soils are being used for sugarcane production.

Striking features of the soil survey program on West Maui include: (1) The great emphasis placed on complete descriptive legends by the survey leader, (2) the high degree of appreciation and understanding of the survey by management personnel of the sugar and pineapple plantations as well as the extent to which they participate in the survey by furnishing tools and men for use by the soil scientist, and (3) the impressive variety of soil characteristics and genetic factors a soil scientist must consider in classifying and mapping the soils. ♦

Outdoor Teaching in High Schools

THREE high schools in Maine feel that students will learn a lot more about nature outside than in a classroom and are planning to develop outdoor laboratories for teaching.

The board of surpervisors of the Waldo County Soil and Water Conservation District and the Soil Conservation Service have been asked to provide technical help in planning these laboratories—the first in Maine—and laying out the trails and ponds.

The three high schools include Mount View in Thorndike, Belfast, and Searsport.

Mount View High School, with 1,200 students, has about 10 acres of natural woodland for use as an outdoor laboratory and plans nature trails, biology study plots, forestry practices, tree planting, and wildlife shrub plantings. Some of this area will be left natural except for trails to cross the area. The school also plans to identify trees, shrubs, plants, mosses, rocks, and soil types, and place in the laboratory signs showing economic uses and other values.

Belfast High School serves 2,000 students and has about 3 acres of land for use as a study area. They will build trails and a small dugout pond.

Searsport High School, with about 700 students, has 4 acres of woodland and some open fields. Nature trails and a pond will be important features of the laboratory.

All these schools plan to have the students do most of the work, and all signs will be made in the shops. Other help will be available as needed—NORRIS D. BRALEY, *Work Unit Conservationist, SCS, Belfast, Maine.* ♦

Science Teacher Clayton Blood; Work Unit Conservationist Norris Braley, Belfast; Principal Robert Perkins of Searsport High School; and Biology Teacher Peter Pierce review a soil and capability map of the outdoor laboratory just before planning.

Cooperators Pass 2 Million Mark

The number of cooperators in soil conservation districts passed the 2 million mark during the 1965 fiscal year.

Preliminary totals of reports from SCS field offices showed more than 2 million cooperators operating more than 662 million acres of land under conservation agreements as of June 30.

The Soil Conservation Service provided more than 3⅓ million separate services on conservation planning and application to more than 1¼ million land owners and operators, a slight increase over the previous year.

At the same time, SCS consultive services increased approximately 10 percent. ♦

Community Builds New Irrigation Pipeline

A NEW irrigation pipeline system has become a reality for Millard County, Utah, where for the past 50 years irrigation water loss has been a real problem.

Installation of the pipeline project was planned, constructed, and financed as a community effort. The project was administered by the Oak Creek Irrigation Company, cooperating with the Millard County Soil Conservation District.

Project action got under way with a public meeting where 95 percent of the 80 families in the area voted in favor of the new concrete pipeline. New officials were elected to the irrigation company to push through the largest project in the county's history.

The accomplishment consisted mainly of laying concrete pipe, construction of forms for reinforced concrete, and the planting of crested wheatgrass and smooth bromegrass on disturbed soil.

Design specifications included an "alpine" type inlet structure to allow high spring runoff and flash floods to pass over without endangering the pipeline.

Technical assistance for their project was made available by the Soil Conservation Service. Financing and other assistance were obtained from the Utah State Water and Power Board, Millard County Agricultural Stabilization and Conservation Committee, and U.S. Forest Service.

Original plans indicated the project would cost about $78,000 if built by a contractor. The decision to let the irrigation company act as contractor and subcontract segments of the job resulted in a $15,000 saving over the estimate.

The 300 residents of Oak City are proud of their accomplishment, having completed, at a big saving and ahead of deadline, a job that will greatly benefit their agricultural enterprises. — DALE WEBBER, *Work Unit Conservationist, SCS, Fillmore, Utah.* ♦

Cloyd Day (l.) explains plans for a 4.6 mile pipeline to members of the irrigation company which acted as contractor for the project. They subcontracted only those jobs they could not do themselves.

Members of the Oak Creek Irrigation Company inspect inlet structure, a unique "alpine" type, designed to withstand flash floods. From left, Josh Finlinson, Reed Lovell, Melvin Anderson, and Peter Nielson. Lovell and Anderson are company officers.

Conservation Plan Key to Success On Butts Farm

THE JAMES BUTTS farm is a busy, prosperous, and attractive place. A modern home, modern farm equipment, farm ponds, a variety of crops on contoured acres, and fat beef cattle attest to the prosperity of the 615-acre farming enterprise in the Slater community of Oklahoma.

The present Butts home is on a corner of a 40-acre piece of land where the owner lived as a boy. His mother lost the farm after his father died. He worked as a plasterer and in a West Coast shipyard during and immediately after World War II and saved enough money to buy his old home place. James and Chinetta Butts now own 284 acres and lease another 331 acres.

Butts credits his success to a sound soil and water conservation program, planned in cooperation with the Little River Soil Conservation District.

"Making out a farm conservation plan was the best thing I ever did for my place," he says. Bill Dowd of the Soil Conservation Service helped him develop the plan for the 284 acres he owned, calling for 106 acres in pasture, 91 acres in crops, 72 acres in hay, and 15 acres in woods. Butts planted grass on the steeper slopes that once had grown cotton.

Butts' hay operation is growing. He produces some 25,000 bales of alfalfa and Johnsongrass hay a year.

Conversion to livestock production and diversification of crops "didn't come easy," Butts says. Yet, his livestock program supported a losing operation in cotton for several years, until the land conversions of his conservation plan were completed.—EARL J. HAYES, *Work Unit Conservationist, SCS, Idabel, Okla.* ♦

James and Chinetta Butts work hard to maintain their prosperous conservation farm.

Soils in Relation to Crop Growth. BY FIRMAN E. BEAR. *1965. Reinhold Pub. Corp., New York. 297 pp., illus. $12.50.*

A book on soils and soil management by a distinguished professor, a fellow and former president of the Soil Conservation Society of America, and for many years editor of the international journal, *Soil Science,* is certain to find wide interest among professional soil conservationists.

The book is not written for professionals, however. Its purpose is to explain the subject matter of the profession to the nonprofessional. This it does with skill and clarity, thanks to the author's professionalism as a writer and editor.

A layman's book on a subject as broad as this must be highly selective in content. This one surveys briefly the general subjects of the origin and classification of soils and their physical, chemical, and biological properties. Then it considers in more detail the practical management of soils for crop production with emphasis on minerals and fertilizers. One chapter is devoted to soil conservation as such.

The book draws heavily on published sources of information and credits many tables and charts to their general sources, but does not cite specific references or provide a list of suggested readings.—B. O.

Introduction to the Outdoors. BY BEN OSBORN. *1965. Audubon Naturalist Society of the Central Atlantic States, Inc., Washington, D. C. 34 pp. $1.00 (20 percent discount in lots of 10 or more to educational and conservation organizations).*

This little book is a guide to reading and study about the outdoors. Prepared as a course outline for the Graduate School, USDA, it is useful to anyone wishing to pursue a personal program of nature study and outdoor experience. While the reference list is directed at the resources of

the mid-Atlantic region, its application covers most of Eastern United States.

It is organized under five main headings: Outdoor Living; The Things Around You; Reading the Landscape; Recreational Use of Inhabited Areas; and Conservation and Education. Following a brief discussion of key topics under each heading, the author gives a comprehensive bibliography of study and reference books. These are scaled as "essential," "preferred," "adequate," and "useful," and further classified as "beginning," "technical," or "general." In addition, specific references are given for sources of equipment, camping directories, natural history and conservation organizations, and publishers' addresses.

Anyone building a library on natural history, conservation, and outdoor living would do well to be guided by this publication. Those who want to plan their reading from public libraries will find it equally dependable.—FRANK C. EDMINSTER, *Resource Development Division, SCS, Washington, D.C.*

Comparisons in Resource Management. EDITED BY HENRY JARRETT. *1961 (Reprinted 1965). University of Nebraska Press, Lincoln. 271 pp., illus; paper. $1.65. $1.65.*

This paperback reprint makes available at low cost the record of discussions of "six notable programs in other countries and their possible U. S. application" conducted in Washington, D. C., by Resources for the Future in the spring of 1961. The book is an exact reproduction, in smaller page size, of the Johns Hopkins Press edition reviewed in the September 1962 issue of *Soil Conservation.*

The problems discussed are: National parks administration in England and Wales, small forest holdings in Sweden, preservation of natural areas in Great Britain, water pollution abatement in West Germany, local integration of programs in Canada, and development of a region in France.

The fact that University of Nebraska Press sees fit to reissue the book attests to the lasting value of the essays.—B. O.

The Federal Lands: Their Use and Management. BY MARION CLAWSON AND BURNELL HELD. *1957. (Reprinted 1965.) University of Nebraska Press, Lincoln. 501 pp., illus. $1.95.*

This paperback edition makes it easy for any conservationist to have on his reference shelf the most comprehensive treatment available on the management and use of our Federal lands. It is an exact reprint, in slightly reduced page size, of the original hardback edition of a study sponsored by Resources for the Future.

The book contains both an exhaustive collection of facts about the Federal lands and a perceptive discussion of problems, policies, and trends in their administration and management.—B. O.

New Publications

The Land Utilization Program 1934 to 1964. BY H. H. WOOTEN. *1965. USDA Agr. Econ. Rpt. 85. 85 pp., illus.* Report covers a submarginal land purchase program that encompassed some 250 utilization projects, totaling 11.3 million acres in 45 States, with occupancy by nearly 25,000 needy families of the acquired land.

SCS's role in this program began in 1938 when the Service was given responsibility of administering some 7 million acres in 105 projects as a part of its program for conservation and improved use of agricultural land. Most of the agricultural projects have been under the administration and management of the Forest Service and the Bureau of Land Management since 1954.

Causes, Control, and Prevention of Gullies at Various New England Locations. BY ROBERT S. PALMER. *1965. USDA Conserv. Res. Rpt. 2. 34 pp., illus.* A factual report on specific examples of gully erosion, primarily in the Connecticut River Valley and citing literature on the subject. Conclusion: "Modifying the environment by cleaning the land of timber, especially from shallow soil, for agricultural use is the principal cause of accelerated erosion. Surface runoff is the major cause of gullying in New England." General suggestions for control are given.

Evapotranspiration and Soil Moisture-Fertilizer Interrelations With Irrigated Winter Wheat in the Southern High Plains. BY MARVIN E. JENSEN AND WILLIS H. SLETTEN. *1965. USDA Conserv. Res. Rpt. 4. 26 pp., illus.* Results of a 3-year study at the Southwestern Great Plains Field Station near Bushland, Tex. Delaying irrigation until the soil moisture was depleted reduced evapotranspiration, but reduced yield even more. Using nitrogen fertilizer gave the opposite result, increasing yields more than water use.

Effects of Alfalfa, Crop Sequence, and Tillage Practice on Intake Rates of Pullman Silty Clay Loam and Grain Yields. BY MARVIN E. JENSEN AND WILLIS H. SLETTEN. *1965. USDA Conserv. Res. Rpt. 1. 25 pp., illus.* Results of a 6-year study of conservation practices on the Pullman soils in the High Plains of Texas. These soils represent more than 5 million acres of the "hardlands" in the Southern High Plains of Texas, New Mexico, and Oklahoma.

A Soil Science Career for You in SCS. *1965 (rev.). USDA Misc. Pub. 716. 4 pp., illus.* A well-illustrated foldout describing the work of SCS soil scientists in soil classification and mapping, soil survey interpretation, and soil investigation in the laboratory and field.

Introduction, Spread and Areal Extent of Saltcedar (Tamarix) in the Western States. BY T. W. ROBINSON. *1965. U. S. Dept. Int., Geol. Surv. Prof. Paper 491-A. 12 pp., folded map.* Gives the history, growth, water consumption, and stream regimen effect of the plant in 15 of the 17 Western States.

Soil Surveys

Deuel County, Nebraska. BY EDWARD H. SAUTTER, ROSS D. GREENAWALT, F. DWIGHT PERTELSON, JOHN E. WILLARD, RUDOLPH ULRICH, AND ROBERT OLSON. *96 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Tompkins County, New York. BY JOHN A. NEELEY. *1965. 241 pp., illus.; maps 3.17 inches to the mile (1:20,000).* Soils surveyed by E. B. Giddings and John A. Neeley, SCS; and Carl S. Pearson, Cornell University Agricultural Experiment Station.

From the Administrator:

Musts for The Year Ahead

AS WE DO every fall, the Administrator's staff and the State Conservationists recently spent a week together taking a searching look at our job, our progress, and our needs and goals for the future.

Out of these deliberations, we agreed on policies and goals for a number of pressing problems in the fast-changing field of resource conservation.

For the guidance of SCS field units and the information of our cooperators, I call special attention to 10 items that we regard as "musts" for the year ahead:

(1) *Respond aggressively to broadening conservation district objectives.*

The central concern of districts has undergone a gradual evolution in 28 years. Early efforts were largely directed toward preventing soil erosion and improving agricultural efficiency. Experience led to broadened understanding of the interrelationships of soil, plant, forest, wildlife, and especially water conservation, and districts strengthened their efforts in these fields. This has led to more comprehensive programs of natural resource planning, development, and utilization, and expansion of group programs to larger areas of land and communities of people. SCS must respond with sound technical guidance for the broadened conservation efforts of local agencies and organizations.

(2) *Strengthen non-Federal financial participation in conservation district work.*

The greatest challenge facing the conservation movement today is how to marshal the human and financial resources to do the job. During the past decade, there has been substantial increase in non-Federal sources of financing conservation. This development must be encouraged.

(3) *Encourage and assist conservation district governing bodies to effectively participate in resource planning for regions and areas as well as for local communities.*

Broad plans for regions and areas should provide the framework for integrated resource development and use. At the same time, we must not forget that the individual property is the basic unit on which conservation must be done in rural areas. Individual plans are absolutely necessary to implement framework plans. We must help local people develop both broad and specific plans without depreciating the need and value of either.

(4) *Pursue an aggressive approach to cost reduction.*

In spite of commendable progress, we must aggressively seek further increases in efficiency to meet cost-reduction goals.

(5) *Meet goals for Negro employment.*

We did a good job last year in moving ahead on employment of Negroes. We intend to continue our nationwide recruitment effort. I have confidence we will succeed again this year in our steady progress in equal employment.

(6) *Take aggressive action to replenish personnel reserves at the entrance or trainee level.*

Consistent with ceilings and quotas, we must provide a consistent, high-quality intake of trainees based on a realistic concept of a well-balanced staff for existing programs and for programs still in the development stage.

(7) *Make land treatment the first and foremost element of watershed projects.*

Land treatment in many watersheds is excellent. Where it is not, it must be accelerated to the extent necessary to make every project, upon completion, a living example or "showcase" of sound land use and treatment.

(8) *Complete the watershed needs inventory promptly and make effective use of the information developed during river basin investigations.*

The recent passage of the Water Resource Planning Act and the new Public Works and Economic Development Act and the increasing public concern over water resources require that we be in a position to respond quickly and efficiently to requests for information about the needs for upstream development. The updated Conservation Needs Inventory and information obtained from river basin surveys are essential to meeting this demand.

(9) *Avoid stimulating surplus crop production.*

We must avoid committing our technical and financial resources to activities that will unduly and inappropriately stimulate the production of surplus crops. We cannot authorize planning assistance for watersheds where it is apparent that the principal benefits will stem from increased production of surplus crops resulting from restoration of former productivity, more intensive land use, or changed land use.

(10) *Speed up soil survey publication and reduce soil survey costs.*

The increasing demand for modern soil surveys in the many nonagricultural aspects of land use and resource planning makes it imperative that we accelerate this important work. We must find part of the funds required for publishing more reports by reducing unit costs.

D. A. WILLIAMS

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Cattle Association Builds a Novel Pond

IMAGINATION AND INITIATIVE in the face of necessity are returning better range management to the Buckhorn Cattle Association, a group of 21 livestock owners with about 1,000 head of range cows, near Castle Dale, Utah.

The Buckhorn Flats cattle allotment "droughted" out during the end of nearly every grazing season and made stockmen bring their stock off the range for lack of water, forcing some ranchers out of business.

Byron Johansen, one of the larger operators, watched for years a spot under the ledges of Cedar Mountain on the north boundary of the allotment, where, in spite of low rainfall, water came dripping over the ledge. He believed some livestock water could be provided if a pond were built under these ledges.

In April 1963, with SCS assistance, a pond of 8 acre-feet capacity equipped with adequate overflow facilities was built under the sheer ledges. Since it has no other source of water except runoff from the ledges, it may have seemed taking a pretty big chance in a desert area of less than 7 inches average annual precipitation.

After the pond was built, the summer waxed hot and dry, but early August brought several small thunder showers, and water came spilling over the ledges filling the pond to within 1 foot of the overflow spillway.

August 1963 rains dripping from the ledges of Cedar Mountain nearly filled the new pond, storing water for many months' supply.

Recently, Marius Johnson, another of the stockmen said, "That sweet little pond has never been dry since the first drop filled it 2 years ago."

Another success story of man conquering the land and making it work for him.—K. MARSEL TINGEY, *Work Unit Conservationist, SCS, Castle Dale, Utah.* ♦